

WHAT IS CLAIMED IS:

1. A centrifugal filter assembly for filtering particulates from a fluid medium, said assembly comprising:

a non-rotating filter housing;

a filter disposed within said housing, said filter being rotatable relative to said housing about an axis of rotation, said filter having an inlet and an outlet for the fluid medium;

filter media disposed within said filter; and

a drive mechanism configured for rotating said filter.

2. The assembly of claim 1, wherein said filter media comprises a cone-stack.

3. The assembly of claim 1, wherein said filter media is configured for increasing a filtration surface area and improving filtration efficiency.

4. The assembly of claim 1, wherein said drive mechanism comprises an electric motor.

5. The assembly of claim 4, wherein said electric motor comprises a brushless direct current motor.

6. The assembly of claim 1, wherein said filter media is replaceable.

7. The assembly of claim 1, further comprising a fixed shaft substantially concentric with the axis of rotation.

8. The assembly of claim 1, further comprising a rotatable shaft substantially concentric with the axis of rotation.

9. A centrifugal filter assembly for filtering particulates from a fluid medium, said assembly comprising:

a non-rotating filter housing;

- 5- a filter disposed within said housing, said filter being rotatable relative to said housing about an axis of rotation, said filter having an inlet and an outlet for the fluid medium;
- a drive mechanism configured for rotating said filter; and
- an electrical controller configured for adjusting a rotational speed of said filter.
10. The assembly of claim 9, wherein said controller comprises a digital signal processor.
11. A motor vehicle, comprising:
- an engine containing a fluid medium; and
- a centrifugal filter assembly for filtering particulates from the fluid medium, said assembly comprising:
- a non-rotating filter housing;
- a filter disposed within said housing, said filter being rotatable relative to said housing about an axis of rotation, said filter having an inlet and an outlet for the fluid medium; and
- a drive mechanism configured for rotating said filter.
12. The motor vehicle of claim 11, further comprising an electrical controller configured for adjusting a rotational speed of said filter.
13. The motor vehicle of claim 12, wherein said controller is configured for adjusting the rotational speed of said filter based on at least one vehicle operating condition, said at least one vehicle operating condition comprising at least one of engine speed, engine oil pressure, and engine oil temperature.

14. A centrifugal filter assembly for filtering contaminants from a fluid medium, comprising:
- a housing;

al
on 08/04/2009
considered
by App
on 10/22/09
102(2)

a filter disposed within said housing and rotatable relative to said housing about an axis
5 of rotation, said filter having an inlet and an outlet for the fluid medium;

a vacuum device in communication with said outlet, said vacuum device configured to
create a vacuum within said housing for drawing at least one of the fluid medium and air through
said outlet; and

a drive mechanism having a rotatable output shaft coupled with said filter for rotating
10 said filter about said axis of rotation.

15. The centrifugal filter assembly of claim 14, wherein said vacuum device comprises a
venturi section.

16. The centrifugal filter assembly of claim 14, wherein said drive mechanism comprises
an electric motor.

17. The centrifugal filter assembly of claim 16, wherein said electric motor comprises a
brushless DC electric motor.

18. The centrifugal filter assembly of claim 14, wherein said vacuum device is
configured to create a vacuum within said housing for drawing the fluid medium and air through
said outlet.

19. The centrifugal filter assembly of claim 14, wherein the fluid medium comprises an
engine fluid.

20. The centrifugal filter assembly of claim 19, wherein the engine fluid comprises
engine oil.

21. The centrifugal filter assembly of claim 14, further comprising a filter head
connected with said housing, said vacuum device being at least one of attached to and disposed
within said filter head.

22. The centrifugal filter assembly of claim 14, further comprising a replaceable filter medium disposed within said filter.

23. The centrifugal filter assembly of claim 14, further comprising a check valve disposed between said vacuum device and said outlet, said check valve being configured for preventing the fluid medium from flowing from said vacuum device to said outlet.

24. The centrifugal filter assembly of claim 14, further comprising a fluid flow control valve in fluid communication with said vacuum device, said fluid flow control valve being configured for preventing flow of the fluid medium through said filter until said vacuum device creates the vacuum.

25. The centrifugal filter assembly of claim 14, further comprising a vent valve in fluid communication with said housing, said vent valve being configured for venting said housing to atmosphere upon a loss of fluid pressure.

26. The centrifugal filter assembly of claim 14, wherein said housing includes a channel for the fluid medium, said filter assembly further comprising a fluid flow restrictor at least partially disposed within said channel, said fluid flow restrictor being configured for restricting a flow of the fluid medium through said channel.

27. The centrifugal filter assembly of claim 26, wherein said channel includes a plurality of internal threads, said fluid flow restrictor having a plurality of external threads engaging said internal threads of said channel, said internal threads defining a first diameter, said external threads defining a second diameter, said first diameter and said second diameter defining a gap therebetween through which the fluid medium can flow.

28. The centrifugal filter assembly of claim 27, wherein said first diameter comprises a first minor diameter, said second diameter comprising a second minor diameter.

29. The centrifugal filter assembly of claim 14, wherein said drive mechanism includes a turbine.

30. A motor vehicle, comprising:

an engine containing a fluid medium; and

a centrifugal filter assembly for filtering contaminants from the fluid medium, said filter assembly comprising:

a housing;

a filter disposed within said housing and rotatable relative to said housing about an axis of rotation, said filter having an inlet and an outlet for the fluid medium;

a vacuum device in communication with said outlet, said vacuum device configured to create a vacuum within said housing for drawing at least one of the fluid medium and air through said outlet; and

a drive mechanism having a rotatable output shaft coupled with said filter for rotating said filter about said axis of rotation.

31. The motor vehicle of claim 30, wherein said drive mechanism has a current draw of less than 20 amperes.

32. The motor vehicle of claim 30, wherein said vacuum device is configured for creating a low pressure region around said filter.

33. The motor vehicle of claim 30, wherein said filter assembly is attached to said engine.

34. A centrifugal filter assembly for filtering particulates from engine oil, comprising:

a housing;

a filter disposed within said housing and rotatable relative to said housing about an axis

of rotation, said filter having an inlet and an outlet for the oil, said filter including a filter media therein, said filter media for filtering the particulates from the engine oil;

a vacuum device in communication with said outlet, said vacuum device being configured for creating a vacuum within said housing; and

an electric motor having a rotatable output device coupled with said filter for rotating said filter about said axis of rotation.

35. The centrifugal filter assembly of claim 34, wherein said vacuum device comprises a venturi section.

36. A centrifugal filter assembly for filtering particulates from engine oil, comprising:
a filter rotatable about an axis of rotation, said filter having an inlet and an outlet for the oil, said filter including a filter media therein, said filter media for filtering the particulates from the engine oil; and

an electric motor having a rotatable output device coupled with said filter for rotating said filter about said axis of rotation.

37. A filtration unit of a centrifugal filter assembly for filtering particulates from a fluid, said filtration unit comprising:

a rotating filter rotatable about a first axis of rotation, said filter receiving a first flow of the fluid, said first flow having a first flow rate;

a turbine connected to said filter, said turbine including a plurality of turbine blades extending generally radially relative to a second axis of rotation, said second axis of rotation being one of parallel to and concentric with said first axis of rotation; and

a nozzle having an outlet and being aligned relative to said turbine, whereby a second flow of the fluid is jetted from said nozzle to thereby impinge upon said turbine and cause said

10 filter to rotate about said first axis of rotation, said second flow having a second flow rate, said nozzle being configured such that said second flow rate is substantially greater than said first flow rate.

38. The filtration unit of claim 37, wherein said nozzle is configured such that said second flow rate is at least twice as great as said first flow rate.

39. The filtration unit of claim 38, wherein said nozzle is configured such that said second flow rate is at least nine times as great as said first flow rate.

40. A method of filtering particulates from a fluid, said method comprising the steps of:
providing a centrifugal filter assembly including a filtration unit, said filtration unit comprising:

a rotating filter rotatable about a first axis of rotation;

5 a turbine connected to said filter, said turbine including a plurality of turbine blades extending generally radially relative to a second axis of rotation, said second axis of rotation being one of parallel to and concentric with said first axis of rotation; and

a nozzle having an outlet and being aligned relative to said turbine;

providing a first flow of the fluid to said filter, said first flow having a first flow rate; and

10 jetting a second flow of the fluid from said nozzle to thereby impinge upon said turbine and cause said filter to rotate about said first axis of rotation, said second flow having a second flow rate substantially greater than said first flow rate.

41. The method of claim 40, wherein said second flow rate is at least twice as great as said first flow rate.

42. The method of claim 41, wherein said second flow rate is at least nine times as great as said first flow rate.